ASSIGNMENT 5

Textbook Assignment: "Soldering, Brazing, Braze Welding, and Wearfacing" and "Shielded Metal-Arc Welding and Wearfacing," pages 6-8 through 7-27.

Learning Objective: Identify principles, materials, and joint designs used in brazing.

5-1. What process is used to join two base metals together by using a filler metal, such as a hard solder?

1. Braze welding
2. Bronze welding
3. Brazing
4. Soldering

5-2. In brazing, what chemical reaction causes the filler metal to bond with the base metal?

1. Oxidation
2. Fusion
3. Reduction
4. Ionization

5-3. One of the advantage that brazing or braze welding has over gas welding is that you can use it to join dissimilar metals.

1. True
2. False

5-4. The use of flux in brazing operations does NOT serve what function?

1. Increasing the flow of brazing filler material
2. Oxidizing the metal surface
3, Permitting the molten filler metal to penetrate the pores of the metal
4. Bringing the brazing filler metal into contact with the metals to be joined

5-5. What type of application should be used with paste or solution fluxes to ensure a uniform coating on metals to be brazed?

1. Spray gun
2. Brush
3. Cloth
4. Putty knife

5-6. What chemical mixture should you use when a prepared flux is not available?

1. A mixture of tallow and water
2. A mixture of copper sulfate and ammonia
3. A mixture of borax and boric acid
4. A mixture of muriatic acid and water

5-7. When lap joining two base metals with silver-based brazing filler metal, you should maintain a clearance of 0.001 inch to 0.003 inch for which of the following reasons?

1. To improve durability
2. To produce a finished braze
3. To extend the bonding area
4. To increase strength

5-8. You are preparing a scarf joint for brazing. A scarf of 19 1/2° produces a bond area that is how many times greater than that of a 90° butt joint?

1. 5 times
2. 2 times
3. 3 times
4. 4 times

Learning Objective: Identify procedures for brazing and braze welding using various joints and base metals.

5-9. What condition will result if there is any movement of the base metal while you are brazing or braze welding?

1. A weakness in the joint
2. An imperfect weld joint
3. An over oxidized surface
4. An faulty bond

5-10. When brazing or braze welding, you heat two pieces of base metai to what temperature?

1. A temperature slightly below the melting temperature of the brazing filler metal
2. A temperature at the melting point of the brazing filler metal
3. The temperature at which the flux turns milky
4. The temperature at which the flux turns clear

5-11. For best results, you should obtain the heat that is needed to braze or braze-weld from an oxygas torch with what kind of flame?

1. Carburizing
2. Oxidizing
3. Neutral
4. Reducing

5-12. Which of the following tools should be used to clean base metals mechanically before brazing or braze welding?

1. Any type of file
2. A piece of emery cloth
3. A piece of steel wool
4. A grinding wheel

5-13. What is the primary reason you must remove all traces of flux after brazing?

1. It will corrode the metal
2. It will weaken the metal
3. It will cause distortion in the pieces brazed
4. It will reduce bonding strength

5-14. Braze welding often produces bonds that are comparable to those made by fusion welding without the destruction of the base metal characteristics .

1. True
2. False

5-15. A loss of strength when subjected to high temperatures and an inability to withstand high stresses are disadvantages of what type of welding?

1. Braze
2. MIG
3. TIG
4. Arc

5-16. You can braze-weld tubing by using a filler-metal rod or what type of rings?

1. Brazing alloy
2. Silver shim
3. Copper alloy
4. Silver alloy

5-17. In preparation for braze welding, you have cleaned, aligned, clamped, or tack-welded the base metals. What is the next step?

1. Tinning
2. Fluxing
3. Preheating
4. Applying filler metal

5-18. When using a prefluxed braze-welding rod, you do NOT have to add flux during welding.

1. True
2. False

5-19. What condition has developed if the filler metal forms little-balls and runs off the metal?

1. The joint is not clean enough
2. The wrong flux was used
3. The metal is too hot
4. The metal is too cold

Learning Objective: Identify the oxygas wearfacing process and the materials used in hardfacing.

5-20. Which of the following is NOT a purpose of wearfacing?

1. To increase resistance to abrasion
2. To buildup undersized parts
3. To stop corrosion and erosion
4. To increase ductility

5-21. What two types of hard-surfacing materials are in general use by the Navy?

1. Iron-base alloys and low-carbon alloys
2. Iron-base alloys and tungsten carbide
3. Stainless steel and copper-based alloys
4. Stainless steel and low-carbon alloys

5-22. Before commencing wearfacing procedures, you must remove scale, rust, and foreign matter from the metal surfaces.

1. True
2. False

5-23. Parts that require wearfacing are preheated with (a) what type of flame and (b) at what temperature?

1. (a) Oxidizing (b) 800°
2. (a) Carburizing (b) 700°
3. (a) Neutral (b) 800°
4. (a) Neutral (b) 700°

5-24. Being able to recognize a “sweated” surface is essential for surfacing. What type of flame do you use to heat the steel to a white heat temperature for sweating?

1. Oxidizing
2. Carburizing
3. Neutral
4. Normalizing

Learning Objective: Identify the processes and principles of metal-arc welding, the operation and care of equipment used, and the specific techniques used in the various welding positions.

5-25. What type of arc energy is provided by the power-source used in arc welding?

1. Alternating
2. Direct
3. Alternating or direct
4. Modulated high frequency

5-26. The basic function of a welding machine is to provide what type of power?

1. High-frequency/low-amperage
2. High-amperage/low-voltage
3. Low-frequency/high-voltage
4. Low-voltage/low-amperage

5-27. A constant flow of electrical current that travels in one direction only has what type of polarity?

1. Alternating
2. Reverse
3. Direct
4. Straight

5-28. Which of the following machines are basic types of welding machines used in the Navy?

1. Alternators, transformers, and transducers
2. Motor generators, rectifiers, and transformers
3. Transducers, voltage regulators, and audio rectifiers
4. Cathode-ray generators, voltage amplifiers, and transducers

5-29. A direct-current generator that has a rated capacity of 600 amperes at 40 volts is most often used for what type of work?

1. General shop welding
2. Inert-gas welding
3. Light-shielded metal arc welding
4. Submerged-arc welding and carbon cutting

5-30. What factors determine the size of a welding cable needed for a job?

1. The size of the electrode and number of lock connections
2. The amperage rating of the machine and distance from the work to the machine
3. The size of the ground cable and capacity of the electrode holder
4. The distance from the ground clamp and type of electrode

5-31. The distance between an operator and any joint in the welding cable should be a minimum of how many feet?

1. 35
2. 25
3. 15
4. 10

5-32. When selecting an electrode holder for a specific task, you should base your selection on what criteria?

1. Current capacity and cable size
2. Type of machine and polarity
3. Electrode diameter and welding current
4. Type of holder insulation and polarity

5-33. The use of a good ground clamp that provides proper grounding is essential to the production of quality welds. Which of the following conditions could develop without this proper grounding?

1. Circuit voltage that fails to produce enough heat
2. A damaged welding machine
3. Damaged cables
4. All of the above

5-34. Which of the following safety devices should you use to protect other personnel in a welding work area from eye flash burns?

1. Welding helmets
2. Flash goggles
3. Face masks
4. Welding screens

5-35. Which of the following classifications does NOT identify one of the five main groups of electrodes?

1. Mild steel
2. Cast iron
3. Nonferrous
4. Ferromagnetic

5-36. The coating on an arc-welding electrode provides which of the following advantages?

1. Improved weld penetration
2. Prevention of oxidation
3. Control and increased stability of the arc
4. All of the above

5-37. Electrodes manufactured in the U.S. must conform to what standards?

1. AISC/CRSI
2. AWS /ASTM
3. NAVOP 1061 (welding)
4. Engineering Standards, U.S. (1996 ed.)

5-38. An electrode that has a minimum tensile strength of 80,000 psi for use in all positions for low alloy, high tensile strength has what designation?

1. E11810
2. E8024
3. E8018-C3
4. E7018

5-39. A welding electrode that has an AWS classification of E-7024 should be used for a metal-arc welding job in what position(s)?

1. Horizontal position only
2. Flat position only
3. Horizontal and flat positions
4. Vertical and overhead

5-40. What is the largest diameter electrode that can be used for vertical and overhead welding?

1. 1/16 inch
2. 1/8 inch
3. 3/16 inch
4. 1/2 inch

5-41. What type of electrode has a heavy iron powder coating with a soft arc and fast deposition rate?

1. Fast-fill
2. Fast-freeze
3. Fill-freeze
4. Low-hydrogen

5-42. When welding stainless steel, you must use what type of electrode?

1. Sulfur/titanium
2. Hydrogen/manganese
3. Cellulose/sodium
4. Chromium/nickel

5-43. Which of the following properties is the basic rule for selecting an electrode for a job?

1. Great tensile strength
2. Composition similar to the base metal
3. The melting temperature
4. The least expensive

5-44. When the electrode is positive and the workpiece is negative, the electrons flow from the workpiece to the electrode. What polarity is being used?

1. Straight
2. Negative
3. Positive
4. Reverse

5-45. In describing polarity, the acronym SENator means

1. straight electrode negative
2. standard electric neutral
3. short-arc electrode neutral
4. special electrode negative

5-46. Which of the following factors is a reason reverse polarity is used in out-of-position welding?

1. Greater heat is generated at the workpiece
2. Less heat is generated in the workpiece
3. Greater heat is required in the base metal
4. A higher deposition of filler metal is required

5-47. What kind of sound does improper polarity emit?

1. Cracking
2. Humming
3. Whistling
4. Hissing

5-48. Which one of the following steps do you take to correct arc blow?

1. Changing the position of the ground clamp
2. Welding away from the ground clamp
3. Changing the position of the workpiece
4. All of the above

5-49. What is the first thing you should do to start an arc by the striking method?

1. Hold the electrode at right angles to the work and strike it sharply against the base metal
2. Bring the electrode into contact with the work by using lateral motion
3. Slowly lower the electrode on to the work until the arc strikes
4. Place the electrode on the work until the base metal melts

5-50. Upon striking an arc, You immediately start the weld to ensure good fusion and penetration.

1. True
2. False

5-51. When using a 5/32-inch-diameter electrode with a recommended current range of 130 to 160 amperes, you should initially use what ampere setting?

1. 130
2. 140
3. 145
4. 150

5-52. What condition occurs when the welding current is too high?

1. Overlap
2. Poor fusion
3. Undercutting
4. Porosity

5-53. What condition(s) can develop when the welding current is too low?

1. Overlap only
2. Poor fusion only
3. Undercutting and poor fusion
4. Overlap and poor fusion

5-54. What kind of sound does a good arc produce when the electrode, current, and polarity are correct?

1. Sharp cracking
2. Humming
3. Whistling
4. Hissing

5-55. When arc welding, the distance between the electrode and the base metal, except in vertical and overhead welding, should be approximately equal to the

1. length of the electrode
2. length of the electrode holder
3. thickness of the base metal
4. diameter of the bare electrode being used

5-56. Of the following practices, which one is correct for breaking an arc with an electrode?

1. It is withdrawn slowly from the crater after the arc has lengthened
2. It is held stationary until the crater is filled, then withdrawn slowly
3. It is held stationary until the equipment is secured
4. It is lowered into the crater until contact is made, then quickly withdrawn

5-57. What maximum thickness can a plate be welded, in one pass, without edge preparation?

1. 1/16 inch
2. 1/8 inch
3. 3/16 inch
4. 1/4 inch

5-58. When flat bead welding, undercutting is eliminated by the use of

1. less current
2. less voltage
3. a proper weave motion
4. a honweaving motion

5-59. What purpose do you use a backing strip when making a butt weld on 3/16-inch plate or heavier in the flat position?

1. To reinforce the weld
2. To hold plates in position while tack welding in place
3. To obtain complete fusion at the root pass of the weld
4. To reflect the heat from the electrode

5-60. What (a) width and (b) thickness of backing strip should be used on plate over 1/2-inch thick?

1. (a) 1 1/2 inches (b) 1/4 inch
2. (a) 2 1/4 inches (b) 3/8 inch
3. (a) 3 1/4 inches (b) 1/8 inch
4. (a) 4 1/2 inches (b) 1/4 inch

5-61. What angle should be maintained between the electrode and the vertical plate of a tee joint when 1/4-inch plate is used in the flat position?

1. 35°
2. 40°
3. 45°
4. 50°

5-62. What angle from the vertical should you hold the electrode when welding a lap joint on plates of varying thicknesses?

1. 15° to 20°
2. 20° to 30°
3. 30° to 40°
4. 40° to 50°

5-63. When vertical welding upwards, how many degrees do you hold the electrode to the vertical?

1. 30°
2. 45°
3. 60°
4. 90°

5-64. Overhead butt welding must be done with relatively small electrodes for which of the following reasons?

1. A long arc is needed to penetrate to the root of the joint
2. A short arc is needed to develop penetration at the root of the joint
3. Reduced current flow through the small electrode is needed to create a fluid puddle
4. Accelerated current flow is need to control the fluid puddle

5-65. When making a fillet weld of a lap or T-joint-in the overhead position, what string bead do you deposit with NO weaving motion of the electrodes?

1. First
2. Second
3. Third
4. Fourth

5-66. Which of the following mistakes can cause undercutting in welds?

1. Current too high
2. Current too low
3. Faulty preheating
4. Joints too rigid

5-67. Which of the following mistakes can cause excessive spatter in welds?

1. Arc too short
2. Arc too long
3. Current too low
4. Rigid joints

5-68. Which of the following mistakes can cause cracked welds?

1. Faulty preparation
2. Using the wrong electrode
3. Using a rigid joint
4. All of the above

5-69. Which of the following mistakes can cause poor penetration?

1. Current too low
2. Current too high
3. Welding speed too slow
4. Rigid joints

5-70. Which of the following mistakes can cause brittle welds?

1. Current too low
2. Current too high
3. Rigid joints
4. Faulty preheating

Learning Objective: Identify principles and techniques of welding pipe using the metal-arc welding process.

5-71. Only the single U-type of butt joint should be used to weld joints between pipes when pipe has what wall thickness?

1. 1/4 inch or less
2. 1/2 inch or less
3. 1/2 inch or more
4. 3/4 inch or more

5-72. When preparing a joint for welding, you should NOT use which of the following procedures?

1. Cleaning the edges of surfaces to be welded
2. Adjusting the joint surfaces so they are smooth and uniform
3. Removing slag from flame-cut edges
4. Removing temper color

5-73. A tack weld should not exceed what size when applied to a pipe with a wall thickness of 1/2 inch?

1. 1-inch long and two thirds of the thickness of the pipe in depth
2. 3/4-inch long and two thirds of the thickness of the pipe in depth
3. 1/2-inch long and 2/3-inch deep
4. 1 1/4-inches long and 1/8-inch deep

5-74. When using an electrode to make the root pass of a multilayer weld on pipe, you should NOT exceed what maximum nominal diameter of electrode?

1. 3/32 inch
2. 1/8 inch
3. 3/16 inch
4. 1/4 inch

5-75. You must weld outside and the temperature is between 0°F and 32°f. Which of the following ACTIONS, if any, should you take before welding?

1. Heat the weld area within 3 inches of the joint to be welded to a temperature warm to the touch
2. Heat the area to the joint to be welded to a temperature of 800°
3. Heat the area to be welded to cherry red
4. None